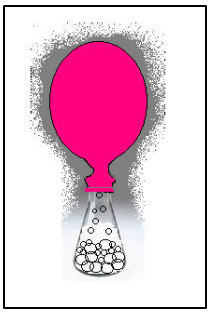
Activity #15

Title: Law of Conservation of Mass - ANSWER SHEET



Trial #	Mass of reactants/container	Mass of products/container	Was the Law of Conservation of Mass Verified?
1	Varies	Less than mass of reactants	NO
2	Varies	Same as mass of reactants	YES
3	Varies	Less than mass of reactants	NO

Inquiry/Analysis:

1. The Law of Conservation of Mass is demonstrated whenever any chemical reaction occurs. Therefore, it was demonstrated in all three trials.

2. The Law of Conservation of Mass was verified only in trial #2 where the mass of the products equaled the mass of the reactants.

3. Some of the mass of the products was allowed to escape into the air because the container was not airtight.

4. The mass of the products was equal to the mass of the reactants in Trial #2 because the entire reaction took place in an airtight container from which no matter could escape.

5. Although the container was covered in Trial #3, some of the molecules of carbon dioxide must have been small enough to pass through the pores of the latex balloon.

6. Physical property of CO_2: Colorless, gaseous state, more dense than air

   Chemical property of CO_2: Does not support combustion (extinguishes the flame of a candle)

7. Carbon dioxide is denser than air because it could be poured downward into an open container without being "lost." If it was not denser than air, it would have floated upward and be mixed with the air in the room when one attempted to pour it from the bottle.

8. The mass of the bottle must be lighter after pouring out the heavier-than-air carbon dioxide. The heavier gas was replaced with lighter air from the room.

Bonus: The balanced chemical equation for

vinegar + baking soda → sodium acetate + water + carbon dioxide

is

$$CH_3COOH + NaHCO_3 \rightarrow NaC_2H_3O_2 + H_2O + CO_2$$

The equation IS balanced as is! No coefficients need to be added to either side.

3 carbon atoms = 3 carbon atoms

5 hydrogen atoms = 5 hydrogen atoms

5 oxygen atoms = 5 oxygen atoms